

# Texas Agricultural Extension Service

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## EVALUATION OF TEXAS SHADE TREES

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Interest in the value and function of shade trees has grown in recent years. These trees perform several environmental functions and damage to them causes a monetary loss by the owner. The first formula for determining a dollar value of shade trees was presented to the National Shade Tree Conference (now International Society of Arboriculture) in 1949. Since then, several revisions have made the formula more acceptable to insurance companies, courts and the Internal Revenue Service (IRS).

When using the formula to arrive at a value anticipated as a casualty loss, be aware that losses as of January 1, 1983 for non-business taxpayers must exceed 10 percent of the adjusted gross income in the year of the loss. Therefore one may need a substantial loss to qualify. For more information on casualty losses, see fact sheet L-1516, *Damage Recovery Opportunities for Loss of Landscape Trees*.

### Replacement Value

The value of shade trees in Texas usually can be determined by the fair market value (planted and guaranteed) from tree nurseries. If a species is not available from a nursery and the tree is small, base the fair market value on that of a similar species of comparable size. Large tree companies sell and plant several species of trees up to 8 inches in diameter. The value of larger trees can be estimated using the formula. The formula usually underestimates the value of small trees.

### The Formula

Four factors are considered in the formula: size, species, condition and location.

$$\text{Size} \times N \times \text{species class} \times \text{condition} \times \text{location} = \text{value}$$

$$N = \text{ISA value per in}^2 \text{ of cross sectional area}$$

### Size

The shade tree evaluation committee of the International Society of Arboriculture determined that the size of a tree's trunk expresses shade tree size. The American Association of Nurserymen's approach in measuring tree diameter is generally followed. For trees with a diameter 4-inches or smaller, the diameter is determined at a height of 6 inches above the ground. For trees with a diameter of 5 to 8 inches, the diameter is determined 12 inches above the ground. For trees with diameters larger than 8 inches the diameter is determined at height (4.5 feet). Exceptions to these rules occur where low branches cause trunk swell, in which case an evaluator would measure the diameter just above the swollen area. For multi-trunked trees, full diameter of the largest trunk plus half the diameter of the other trunks determines the diameter for computing the cross section area which is the number used for the size factor in the formula (figure 1). The cross section area is determined by the formula  $0.7854D^2$  where D equals the diameter measured. The current basic value of a perfect specimen shade tree, in the committee's opinion, is \$22 per square inch of trunk cross section. For example, a 10-inch Class 1 tree in perfect condition and location would be worth \$1,728 (at \$22 per square inch).

$$0.7854D^2 = 0.7854(10)^2 = 78.54 \text{ in}^2$$

$$78.54 \text{ in}^2 \times (\$22/\text{in}^2) = \$1,728$$

### Species

Not all species and varieties of trees are of equal value. Permanence, maintenance needs, landscape quality and site adaptability influence the value of a species. Grouping tree species into value classes is subjective and may vary from one part of the state and one tree specialist to another. The following list can guide the appraiser who must also judge based on experience with the species. Species value of trees not listed above should be made by the specialist involved in the evaluation.

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## SIZE

To determine the diameter of a tree, measure a small tree (4 inches or less) at 6 inches above the ground, a medium-sized tree (5 to 8 inches in diameter) at 12 inches above the ground and a large tree (larger than 8 inches) at 4½ feet above the ground. Use sound judgment on measuring odd shaped trees. In measuring multi-trunk trees, measure the diameter of the largest trunk and add half the diameter of the other trunks.

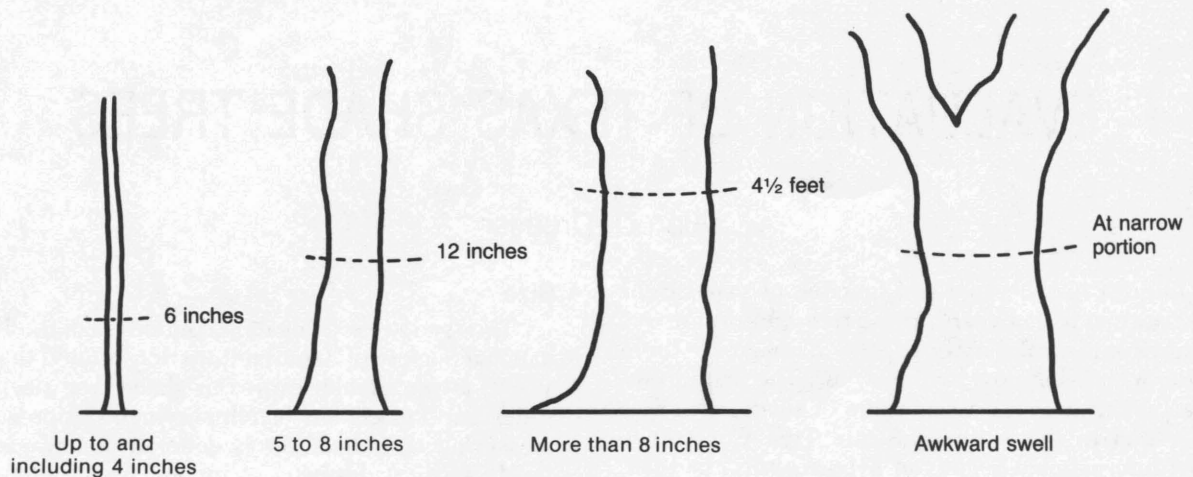


Figure 1.

### Class 1—100 percent

*Carya spp.*—Hickories  
*Carya illinoensis*—Pecan  
*Cornus florida*—Flowering Dogwood  
*Diospyros texana*—Texas Persimmon  
*Fagus grandifolia*—American Beech  
*Ilex opaca*—American Holly  
*Ilex vomitoria*—Yaupon Holly  
*Juglans nigra*—Black Walnut  
*Liquidambar styraciflua*—Sweetgum  
*Magnolia grandiflora*—Southern Magnolia  
*Magnolia virginiana*—Sweetbay  
*Nyssa sylvatica*—Tupelo  
*Picea pungens*—Colorado Blue Spruce  
*Pinus edulis*—Piñon Pine  
*Pinus ponderosa*—Ponderosa Pine  
*Pinus taeda*—Loblolly Pine  
*Pithecellobium flexicaule*—Texas Ebony  
*Quercus alba*—White Oak  
*Quercus falcata*—Southern Red Oak  
*Quercus macrocarpa*—Bur Oak  
*Quercus muhlenbergii*—Chinkapin Oak  
*Quercus nigra*—Water Oak  
*Quercus shumardii*—Shumard Oak  
*Quercus texana*—Spanish Oak  
*Quercus virginiana*—Live Oak  
*Sophora secundiflora*—Mescal Bean Sophora  
*Taxodium distichum*—Baldcypress  
*Ulmus crassifolia*—Cedar Elm

### Class 2—80 percent

*Acer grandidentatum sinuosum*—Bigtooth Maple  
*Arbutus texana*—Texas Madrone  
*Ehretia anacua*—Anaqua  
*Fraxinus velutina* (Select Male)—Velvet Ash  
*Fraxinus velutina* 'glabra'—Modesto Ash  
*Ginkgo biloba*—Ginkgo  
*Gymnocladus dioica*—Kentucky Coffeetree  
*Koelreuteria bipinnata*—Southern Golden Raintree  
*Koelreuteria paniculata*—Panicked Golden Raintree  
*Lagerstroemia indica*—Crepemyrtle  
*Liriodendron tulipifera*—Tulip-poplar  
*Olea manzanilla*—Manzanilla Olive  
*Pinus elliottii*—Slash Pine  
*Pinus halepensis*—Aleppo Pine  
*Pinus nigra*—Austrian Pine  
*Pinus thunbergii*—Japanese Black Pine  
*Pistacia chinensis*—Chinese Pistachio  
*Pyrus calleryana*—Callery Pear Cultivars  
*Quercus phellos*—Willow Oak  
*Quercus stellata*—Post Oak  
*Quercus velutina*—Black Oak  
*Sophora japonica*—Japanese Pogodatree  
*Ulmus americana*—American Elm

### Class 3—60 percent

*Acacia farnesiana*—Huisache  
*Acer rubrum*—Red maple

*Betula nigra*—River Birch  
*Broussonetia papyrifera*—Paper Mulberry  
*Bumellia lanuginosa*—Gum Elastic  
*Cedrus deodara*—Deodar Cedar  
*Celtis occidentalis*—Common Hackberry  
*Cercis canadensis*—Redbud  
*Chilopsis linearis*—Desert Willow  
*Cupressus arizonica*—Arizona Cypress  
*Eriobotrya japonica*—Loquat  
*Fraxinus pennsylvanica lanceolata*—Green Ash  
*Fraxinus velutina* (seedling)—Arizona Ash  
*Gleditsia triacanthos inermis*—Thornless  
     Honeylocust  
*Juniperus spp.*—Junipers, Cedar  
*Leucaena pulverulenta*—Great Lead-tree  
*Malus species and varieties*—Flowering Crab Apples  
*Morus alba* (fruitless)—Fruitless Mulberry  
*Persea americana*—Avocado  
*Persea borbonia*—Redbay  
*Pinus echinata*—Shortleaf Pine  
*Pinus pinea*—Italian Stone Pine  
*Platanus occidentalis*—American Planetrees,  
     Sycamore  
*Prosopis glandulosa*—Honey Mesquite  
*Prunus mexicana*—Mexican Plum  
*Sabium sebiferum*—Chinese Tallow  
*Sapindus drummondii*—Western Soapberry  
*Ulmus parvifolia*—Chinese Elm  
*Ulmus parvifolia sempervirens*—Evergreen Elm

#### Class 4—40 percent

*Acer negundo*—Boxelder  
*Acer saccharinum*—Silver Maple  
*Ailanthus altissima*—Tree of Heaven  
*Albizia julibrissin*—Silktree  
*Catalpa spp.*—Catalpa  
*Celtis laevigata*—Sugarberry  
*Crataegus spp.*—Hawthorns  
*Eleagnus angustifolius*—Russian Olive  
*Firmiana simplex*—Chinese Parasol Tree  
*Maclura pomifera*—Bois d'Arc  
*Melia azedarach*—Chinaberry  
*Morus rubra*—Red Mulberry  
*Parkinsonia aculeata*—Palo Verde  
*Populus spp.*—Cottonwood and Poplars  
*Prunus blireiana*—Ornamental Plum  
*Robinia pseudoacacia*—Black Locust  
*Salix spp.*—Willows  
*Tamarix spp.*—Tamarisk  
*Thuja spp.*—Arborvitae  
*Ulmus pumila*—Siberian Elm  
*Ziyphus jujube*—Jujube

## Condition

Few shade trees are perfect. As trees become large and old, they often become defective through decay, broken limbs, damage by humans or uneven growth. The specialist appraising the tree must judge the condition on a percentage basis. For example, a 10-inch tree in Class 1 might be poorly proportioned or display symptoms of heart rot. Instead of being worth \$1,728, it would be appraised at 60 percent or \$1,037. A knowledge of tree pathology, entomology and physiology is important to professional evaluation. In some situations consulting a diagnostician before deciding a tree's condition percentage makes the evaluator more confident. As a guide, the following system can help a trained arborist. There are six condition factors, A through F, each rate from one to five. The sum of the rating for each of the six factors is the tree's condition rating. The percent based on this rating is used in the formula.

A. Trunk condition	Rating
Sound and solid	5
Missing section of bark	3
Extensive decay	1
B. Growth (varies with species)	
Vigorous	3
Moderate	2
Poor	1
C. Structure	
Sound	5
One major or several minor limbs dead, broken or missing	3
Two or more major limbs dead, broken or missing	1
D. Insect and disease	
No pests	3
One pest	2
Two or more pests	1
E. Crown development	
Full and balanced	5
Full but unbalanced	3
Unbalanced and lacking a full crown	1
F. Life expectancy	
More than 30 years	5
Fifteen to 20 years	3
Less than 5 years	1



Total point rating (A + B + C + D + E + F)	Percentage to use in formula
26-23	80-100
22-19	60- 80
18-14	40- 60
13-10	20- 40
9- 6	0- 20

Only an experienced evaluator can make accurate condition determinations.

### Location

Location determines the value of a tree in the landscape (figure 2). An understanding of the specific tree's role helps when applying this factor to the formula. The following conditions are outlined for guidance:

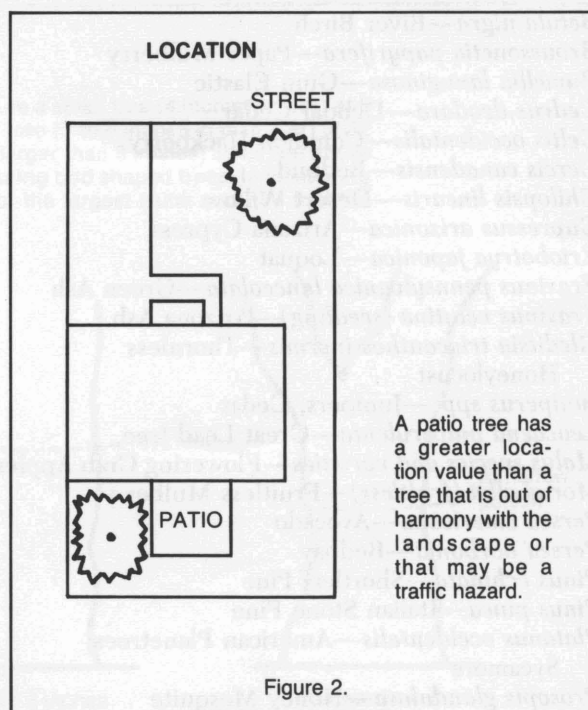
Feature or historical trees	90-100%
Average residential, landscape trees	80- 90%
Malls or shopping center trees	75- 85%
Public and commercial area trees	70- 80%
Arboretum and park trees	60- 80%
Golf course trees, strategically located	60- 80%
Street and boulevard trees	60- 80%
Screen and windbreak trees	60- 70%
Recreational and picnic area trees	60- 70%
Industrial area trees	50- 70%
Out-of-city highway trees	40- 60%
Native, open woods trees	30- 40%

For example, if a 15-inch American elm of good form, without diseases, shades a picnic area in a city park in Central Texas and is vandalized with an axe, how is the monetary damage determined, assuming the tree has no chance of survival? The formula:

$$\text{Size} \times \$22 \times \text{class} \times \text{condition} \times \text{location} = \text{value}$$

$$(0.7854 (15^2) \times (\$22) \times (80\%) \times (100\%) \times (80\%) = \$2,488$$

Only a professional tree specialist should evaluate shade trees for insurance companies or courts. The IRS approaches tree appraisal differently. Any casualty loss claim must include proof that the value of the property was reduced by the same amount as that claimed. Using qualified appraisers, principles of



shade tree evaluation outlined here may apply to tax losses. Replacement costs are acceptable as proof of property value reduction. To back up tree casualty loss claims, use IRS rulings on similar tree and shrub losses. The attitude of regional reviewing officials toward the legal standing or value of shade trees also may determine the extent of a casualty loss. The Tax Equity and Fiscal Responsibility Act of 1982 states that personal casualty losses are claimable only to the extent that they exceed 10 percent of the taxpayer's adjusted gross income for the year of occurrence. There is still a \$100 exclusion.

The formula for shade tree evaluation cannot determine the value of fruit or nut bearing trees, which can be appropriately determined by crop yield. Neither is it intended for evaluation of palm trees, since palms do not expand in diameter. Fair market value or a dollar value per foot of height growth determines the worth of palm trees.

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